QUALITY ASSURANCE IN SUBJECTIVE AREAS

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ABSTRACT: In some areas like handwriting, latent prints, shoe prints and toolmarks, hairs comparison, bloodstains analysis, voice analysis and arson investigation, it is quite difficult to demonstrate that the test is under control, i.e. that all the appropriately trained staff will obtain the same results within defined limits (probability or numerical values). So, what kind of quality tools does a forensic science laboratory have available to help minimise subjectivity on the part of the analyst and justify his opinion?

It is the challenge of the ENFSI Quality and Competence and ENFSI Expert Working Groups to define and include these in best practice manuals. Some tools like competency tests, independent checks by another scientist, standardisation of comparison criteria, could be used to reach this target.

INTRODUCTION

From a Quality Assurance point of view, in the field of forensic science we can distinguish between objective and subjective tests.

According to the ILAC guidelines for forensic science laboratories, an objective test is a "test which have been documented and validated is under control so that it can be demonstrated that all appropriately trained staff will obtain the same results within defined limits. These defined limits relate to expressions of degrees of probability as well as numerical values".

Concerning a subjective test, the expert explains his/her test results by drawing conclusions, giving opinion and/or interpretations derived from qualitative and/or quantitative results based on knowledge, experience or specialised data or other sources of information, i.e. all kind of expertises mainly based on valuation/qualifying (not quantifying) operations.

So, in some forensic science areas, called "subjective" areas (e.g. handwriting, voice analysis, toolmarks, shoeprints, bloodstains analysis, hairs,

latent prints etc.), it is quite difficult to demonstrate that the test carried out is under control. Consequently, more than the ISO/IEC 17025 and ILAC requirements, some additional recommendations concerning the methodology, the expert's competence and the quality control, must be reached to help minimise subjectivity on the part of the analyst and justify his/her "opinion" and ensure consistency and reliability in identification, comparison and interpretation of evidential findings.

RECOMMENDATIONS CONCERNING THE EXPERT METHODOLOGY

As one knows, in United States one deals with the admissibility of scientific evidence under Daubert. The judge has a gatekeeper role to define if the following criteria are reached:

1. Has the scientific theory or technique been (empirically) tested? One should ensure that criteria is reached at the implementation stage of a technique, carrying out validation and verification of given/new methods by assessment against established methods, testing repeatability by assessment using reference materials, testing reproducibility through proficiency tests/collaborative exercises, defining limitations to the range of application and using of defined and documented interpretation values.

2. Has the expert's methodology (scientific theory and technique) been subjected to peer review and publication? Before implementation (use in casework), the expert's methodology should be tested and submitted to a peer review in order to obtain widespread acceptance within a relevant scientific community. Each ENFSI Expert Working Group/publication body should define a peer review procedure which will insure the integrity of the peer review process:
   − the reviewers should have: knowledge, skills, experience and time to review;
   − the process should insure the reviewers' and authors' anonymity;
   − the reviewer recommends, accept, accept with revisions, revise and resubmit or reject, and decisions taken must be recorded;
   − a procedure to anticipate the case in which the reviewers don't agree (e.g. two initials reviewers and a third one to solve this case).

3. What is the known or potential error rate? A consensus process between qualified examiners should be required and be documented to demonstrate if empirical studies have complete theoretical basis and/or statistical significance and so to validate the scientific basis of

an examination (e.g. standardisation of comparison criteria – number and nature – to determine individualisation or exclusion).
4. Can the technique and its results be explained with sufficient clearness and simplicity? It is fundamental that the Court and the jury can understand its whole meaning.

RECOMMENDATIONS CONCERNING THE QUALITY CONTROL

Individual proficiency test:

To assess regularly the skills of an expert as an individual it should be necessary to submit them to a proficiency test scheme.

Intra-laboratory peer review:

The laboratory should have a procedure which defines that any results/statement leaves the laboratory only if it has been shown to a nominated checker (i.e. independent check of the results and interpretation by an additional competent expert). The checker does not rework the case but he is shown all the relevant materials that have been used for investigation without the drawn conclusion (final result).

In case there is no competent additional expert of the same area available two alternatives are possible:
– Alternative 1: Plausibility check of the case (material and drawn conclusion) by a competent additional expert within the organisation.
– Alternative 2: Repeated investigation with a different team of case workers (investigators) under the same expert.

In case of non conformity a third check will be necessary.

To minimise the expenditure (regarding an extreme case load in most branches) a random sample may be selected for independent check with a defined frequency recommended by the ENFSI Expert Working Group.

The results of the two independent checks have to be compared and fully documented (conclusion scale must be defined):
1. The drawn conclusions are the same. The results can leave the laboratory.
2. The differences among the drawn conclusions are insignificant. A discussion of the results with both experts is required to find an agreement, otherwise a third check will be necessary.
3. The differences among the drawn conclusions are more than insignificant. A third check is required.

The significant and insignificant differences among drawn conclusions have to be defined and documented. Agreements and checks must be fully documented and recorded.

RECOMMENDATIONS CONCERNING THE COMPETENCE
OF THE SCIENTIST

In subjective areas a test result is an expert opinion (test result interpretation). So, an expert must be qualified and competent (training and experience), i.e. it is recommended to subject him/her to a competency test: assessment, with a defined frequency, by qualified expert in the same field regarding requirements (knowledge, skills, experience, training or education etc.) defined by the ENFSI Expert Working Group. All the competency test shall be fully documented and their results recorded.

References:

1. Found B., Rogers D., A consideration of the theoretical basis for forensic handwriting examination *IJFDE* 1998, vol. 4, no. 2.
2. Fridman D., The judicial gatekeeping project 1999.
3. Gingles R., Quality management of difficult areas, 1st EMFS, Lausanne 1997.
4. Matson J. V., Effective expert witnessing, CRC Press 1999.